

Audit Report



INFORMATION ASSURANCE IN THE ADVANCED LOGISTICS PROGRAM

Report No. D-2000-122

May 12, 2000

Office of the Inspector General
Department of Defense

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DEPARTMENT OF DEFENSE
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May 12, 2000

MEMORANDUM FOR DIRECTOR, DEFENSE ADVANCED RESEARCH
PROJECTS AGENCY

SUBJECT: Audit Report on the Information Assurance in the Advanced Logistics
Program (Report No. D-2000-122)

We are providing this audit report for information and use. We considered management comments on a draft of this report in preparing the final report

Comments on the draft of this report conformed to the requirements of DoD Directive 7650.3 and left no unresolved issues. Therefore, no additional comments are required.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Raymond A. Spencer at (703) 604-9071 (DSN 664-9071) (rspencer@dodig.osd.mil) or Mr. Roger H. Florence at (703) 604-9067 (DSN 664-9067) (rflorence@dodig.osd.mil). See Appendix C for the report distribution. The audit team members are listed inside the back cover.

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Report No. D-2000-122

May 12, 2000

(Project No. D2000-AB-0074.00)

Information Assurance in the Advanced Logistics Program

Executive Summary

Introduction. The Advanced Logistics Program is jointly funded by the Defense Advanced Research Project Agency and the Defense Logistics Agency to explore information technology capabilities in support of the Joint Vision 2010 and the focused logistics operational concept. The Defense Advanced Research Project Agency issued an other transaction agreement, in 1996, to the Advanced Logistics Program Integration and Engineering Consortium for the prototype development. The program is a five-year, \$59.2 million effort and has completed its third year.

The objectives of the Advanced Logistics Program were to define, develop, and demonstrate advanced information technologies that would assist in placing materiel and capabilities at the right place at the right time as well as having the ability to track, refurbish, sustain, and redeploy those assets more effectively. The Advanced Logistics Program will develop information technology capabilities in four areas: automated logistics planning, real-time logistics situation assessment, end-to-end logistics movement control, and rapid supply.

Objectives. The audit objective was to evaluate whether the requirements for information assurance, total asset visibility, and acquisition strategy planning for the Advanced Logistics Program were being properly addressed.

Results. The Defense Advanced Research Project Agency is developing and demonstrating an advanced information technology capability for the DoD logistics community's use without conducting an information assurance risk assessment to evaluate the security risks associated with the technology development. Defense agencies and Military Departments have monitored the technology development, but have not made financial commitments to continue the program. The lack of a security risk assessment is a deterrent to transitioning the Advanced Logistics Program information technology to Defense agencies and Military Departments. As a result, the advanced information technology capability will be offered to the Defense agencies and Military Departments without assessing the potential technology security risks to its users. See Appendix A for details on the management control program.

Recommendation. We recommend that the Director, Defense Advanced Research Projects Agency, perform an information assurance risk assessment for the Advanced Logistics Program before development is completed and before it is introduced to the Defense agencies and the Military Departments.

Management Comments. The Director, Defense Advanced Research Projects Agency, concurred and stated that the Sandia National Laboratory was commissioned to perform an information risk assessment starting in July 2000. A discussion of management comments is in the Finding section of the report, and the complete text of the management comments is in the Management Comments section.

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Background

The Advanced Logistics Program (ALP) explores opportunities to connect logistics and operations information in an operational plan in support of the Joint Vision 2010 and the operational concept of focused logistics. The Defense Advanced Research Project Agency (DARPA) and the Defense Logistics Agency jointly funded the information technology program in partnership with the Joint Staff and the U. S. Transportation Command. The ALP is a \$59.2 million, five-year program that will conclude in FY 2001. The ALP objective is to develop and demonstrate through software and procedures the ability to connect information technology operations and logistics databases to manage the DoD logistics pipeline. Specifically, ALP will produce and demonstrate advanced information technologies that assist in putting the right materiel, in the right place, at the right time, with reduced reliance on large DoD inventories and at a reduced cost.

The ALP will define, develop, and demonstrate information technologies that will allow the logistics community to deploy, track, refurbish, and redeploy logistics and transportation assets more efficiently. Those technologies will be demonstrated by a prototype that couples continuous planning and execution monitoring. Key to the success of ALP will be the development of a software architecture that can rapidly derive detailed logistics plans from operational requirements.

The ALP will be able to interconnect applicable databases to the following four areas:

- Automated logistics planning that will link the joint operational and joint logistical planning and execution processes to produce Timed Phased Force Deployment Data in 1 hour. The plan will include data from the highest to the lowest military echelon.
- Real-time situation assessment that will develop technologies and methods for providing users at all echelons with the ability to assess the logistics situation by converting logistics data into visual images to understand current and project future situations.
- End-to-end movement control that will develop technologies and methods to control the transportation and logistics pipeline by automated development of transportation plans and continuous monitoring techniques to optimize lift assets and minimize staging.
- Rapid supply that will develop technologies and methods necessary to establish interoperable connectivity and access to DoD and commercial vendors, suppliers, and manufacturers to increase materiel readiness, decrease cycle times for satisfying materiel requirements, and reduce DoD inventory and overhead cost.

DARPA issued a prototype other transaction agreement for the development of the ALP. Other transaction agreements, authorized under 10 U.S.C. 2371, are instruments other than contracts, grants, and cooperative agreements, which are used to stimulate, support, acquire research, or develop prototype projects. While initially developed for advanced research projects, the National Defense Authorization Act of FY 1994, section 845, augmented the other transaction agreement authority for prototype projects that are directly relevant to weapons or weapon systems. Section 845 may be used even when a traditional contract would be feasible or appropriate.

Objectives

The audit objective was to evaluate whether the requirements for information assurance, total asset visibility, and acquisition strategy planning for the ALP were being properly addressed. See Appendix A for the summary of the scope and methodology and Appendix B for results related to the total asset visibility and acquisition strategy planning objectives.

Information Assurance for the Advanced Logistics Program

DARPA is developing and demonstrating an information technology capability without properly addressing information assurance (security risk). DARPA officials believed that the development of the information technology capabilities was research related and therefore did not conduct a security risk assessment. As a result, DARPA will be offering the ALP information technology, funded at \$59.2 million, to Defense agencies and Military Departments without knowing the potential risks. Also, the lack of a security risk assessment may deter Defense agencies and Military Departments from expressing a committed interest in the ALP.

Background

The ALP's goal is to demonstrate an end-to-end automated information technology logistics concept for focused logistics. Focused logistics is intended to combine logistics information and transportation technologies for rapid crisis response, deployment, and sustainment and to track and shift units, equipment, and supplies while en route to the warfighter. The ALP mission is to investigate, design, develop, and demonstrate a prototype logistics system that is based on advanced information technology. The ALP has completed 3 years of a 5-year program, with a planned expenditure of \$59.2 million. ALP will provide the capability to obtain information from logistics and operations systems and provide operational users with the ability to rapidly plan, execute, and replan for more responsive and efficient logistical support.

Advanced Logistics Program Development and Demonstrations

The ALP prototype system is an assembly of computer hardware, software, and firmware configured to collect, create, communicate, compute, process, store and or control data or information. The ALP prototype system's capabilities were coordinated with potential users in workshops and demonstrations. The workshops involved discussions on the evolving strategies, plans, and requirements for transitioning the ALP technologies. The workshop attendees included representatives from the Joint Staff, the Defense Logistics Agency, the Military Departments, the U. S. Transportation Command, and the U. S. Forces Command. In 1997 and 1999, two demonstrations were conducted to exhibit the information technology capabilities that were being developed. The scenarios included real-time, detailed logistics planning involving a major force deployment to Southwest Asia. Those demonstrations used information databases from the Defense Logistics Agency, the U. S. Transportation Command, the U. S. Central Command, and the U. S. Forces Command to obtain database information from the Global Transportation Network, the Joint Total Asset Visibility System, and the Global Decision Support System to show

how logistics planning could be accomplished using existing databases from various logistics and operational commands. The demonstrations were conducted under a "read only" condition, with unclassified databases, thus ensuring the demonstrations did not corrupt or otherwise impact operational information.

An expanded ALP demonstration was conducted in February 2000 to analyze the technical capability of the ALP infrastructure and to demonstrate an ALP network "read only" capability, the ability to perform replanning, and the ability to function with real-world communication systems. The participants in this demonstration were the same as in previous demonstrations but included selected operational units. As with previous demonstrations, the ALP technology was limited to "read only" and included only unclassified databases from the participants.

Information Assurance

In response to information assurance (security) concerns voiced by attendees during the January 1999 ALP demonstration, DARPA developers incorporated commercial information technology capabilities in the ALP technology. Information assurance is a measure of confidence that security features, practices, procedures, and the architecture of an information technology system accurately mediate and enforce the security policy. Information assurance measures and controls confidentiality, integrity, availability, and accountability of the information processed and stored by a computer.

In October 1999, developers incorporated three commercial-off-the-shelf security products consisting of Public Key Infrastructure (PKI) Enabling, the signing of Java JAR files, and Internet Protocol (IP) security. The PKI provides message authentication and integrity for communications between users; Java JAR will prevent malicious code from being downloaded into the ALP prototype system; and the IP will provide secure encrypted communications between ALP sites. All three commercial-off-the-shelf security products were installed into the ALP architecture without a risk or vulnerability assessment. Officials plan to test the security measures implemented in the ALP architecture during the last year of the program.

Although DARPA developers considered information assurance, they did not conduct an assessment of the security risks to the potential users of the ALP technology. Without a risk assessment, potential ALP technology users would either use the technology not knowing the potential risks or conduct a review themselves prior to using the technology.

Information Technology Guidance

Office of Management and Budget Circular A-130, "Management of Federal Information Resources," February 8, 1996, established Government policy for information systems. Circular A-130, Appendix III, "Security of Federal

Automated Information Resources," states that a system should normally include hardware, software, information, data, applications, communications, and people. Appendix III also states that a major application requires special attention to security because of the risk and magnitude of the harm resulting from the loss, misuse, or unauthorized access to or modification of the information in the application.

DoD Instruction 5200.40, "DoD Information Technology Security Certification and Accreditation Process," December 30, 1997, provides DoD managers with a unified standard process to incorporate adequate computer security into their systems. DoD Instruction 5200.40 defines an architecture as the configuration of any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. DoD Instruction 5200.40 defines a system as a set of interrelated components consisting of a mission, environment, and architecture. The ALP has both system components and architecture.

The Office of the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) recognizes that, due to advances in information technology and the increased vulnerabilities to the Defense Information Infrastructure, security planning should begin with technology development. Information technology developers have a responsibility to users to implement information assurance technology from the beginning of the project. The use of prototypes does not eliminate the need for formal metrics and inspections of a project; rather, prototypes should highlight the need for security measures to be implemented. Therefore, a risk management plan should be established to accomplish feasible security measures and should remain active throughout the project's life-cycle to identify and mitigate risks before they become serious problems.

The DARPA developers stated that the Defense agencies and Military Departments that acquire ALP will determine the information assurance (security) requirements for their systems and will also be responsible for the cost of adding security and completing a risk assessment and accreditation. DARPA developers believed that security would evolve as the system stabilizes and also stated that there was no requirement to perform a risk assessment because the ALP was a research effort.

Transition Plan

Defense agencies and Military Departments have not expressed a committed interest in the ALP information technology effort, which is scheduled to end October 2001, although DARPA officials have attempted to obtain commitments.

Defense agencies and Military Departments indicated that they may use parts of the ALP technology in their ongoing or planned pilot programs. The following are Defense agencies and Military Departments that may use the ALP technology:

- DARPA, in conjunction with the Defense Information Systems Agency, is using components of the ALP information technology in the development of the Joint Logistics Advanced Concept and Technology Demonstrator (Joint Logistics Demonstrator). The Joint Logistics Demonstrator is a multi-phase program, which will provide an experimental environment for logisticians to evaluate developing decision support tools and technologies for increased operational capabilities. The Joint Logistics Demonstrator provides the opportunity to evaluate the potential fielding of advanced technologies such as those developed by the ALP to satisfy the requirements of the joint Defense agencies and Military Departments. The Joint Logistics Demonstrator continued through April 2000. The technologies of the Joint Logistics Demonstrator are planned to transition to the DARPA Joint Theater Logistics Advanced Concept and Technology Demonstrator for further development. The Joint Theater Logistics Demonstrator will continue to develop and demonstrate advanced web-based technologies, software tools, and protocols that will produce a real-time capability to improve the communications, coordination, and collaboration between the logistics and operations communities.
- The Defense Logistics Agency plans to use portions of the ALP information technology in its prototype for Finished Goods Inventory. The ALP information technology will enable small components, called clusters, to communicate with each other using standard syntax and protocols. The Defense Logistics Agency prototype is planned to begin in 2000.
- The U. S. Transportation Command plans to use portions of the ALP information technology in its Agile Transportation – AT 2000 Advanced Concept Technology Demonstrator. The ALP will provide the foundation for handling various database integrations. The AT 2000 Advanced Concept Technology Demonstrator is planned to improve the current Defense Transportation System. Officials of the U. S. Transportation Command have requested \$45 million in FY 2001 for the AT 2000 Advanced Concept Technology Demonstrator; however, at the time of this report, funding had not been approved.

Summary

DARPA officials believed that the development and demonstration of the ALP, an information technology prototype, was a research effort and therefore that DARPA was not required to conduct a security risk assessment. Good business practices would suggest that information technology developers conduct security risk assessments to identify potential vulnerabilities that the ALP technology may introduce. The lack of a security risk assessment is a deterrent to

transitioning the ALP information technology to the Defense agencies and Military Department who may not be willing to accept the cost and unknown risks associated with implementing security into ALP. It has been a tenet of the computer community that the cost to the user for adding security could be more than 10 times the cost had security been included in the system's initial design phase. If DARPA does not conduct an information assurance risk assessment, the full capabilities of ALP may never materialize.

Recommendation, Management Comments, and Audit Response

We recommend that the Director, Defense Advanced Research Projects Agency, perform an information assurance risk assessment for the Advanced Logistics Program before development is completed and before it is introduced to the Defense agencies and the Military Departments.

Management Comments. The Director, Defense Advanced Research Projects Agency, concurred with the recommendation and has arranged with the Sandia National Laboratory's Secure Network and Information Systems Group to perform an information assurance risk assessment during July through November 2000. However, the Director, Defense Advanced Research Projects Agency, stated that the Advanced Logistic Program is a research and development project, not an information system, and therefore was not subject to the guidelines and constraints of the Office of Management and Budget Circular A-130.

Audit Response. The Defense Advanced Research Projects Agency's comments are responsive to the recommendation and the information technology security requirements of the Office of Management and Budget Circular A-130.

Appendix A. Audit Process

Scope and Methodology

Work Performed. We performed this economy and efficiency audit from October 1999 through January 2000, in accordance with auditing standards issued by the Comptroller of the United States, as implemented by the Inspector General, DoD. We did not use computer-processed data or statistical sampling procedures to develop conclusions on this audit. Members of the Technical Assessment Division, Office of the Inspector General, DoD, provided assistance during the audit. We examined the ALP for security considerations, for coordination with other DoD logistics and transportation activities, and for coordination of the transition to potential users. To accomplish our objectives, we conducted meetings with key DARPA program officials and various DoD organizations, evaluated documentation provided by the officials and organizations, and compared and analyzed the documentation to applicable criteria.

Contacts During the Audit. We visited or contacted individuals and organizations within DoD. Further details are available on request.

DoD-wide Corporate Level Government Performance and Results Act (GPRA) Coverage. In response to the GPRA, the Secretary of Defense annually establishes DoD-wide corporate level performance goals, subordinate performance goals, and performance measures. This report pertains to achievement of the following goal, subordinate goal, and performance measure.

FY 2001 DoD Corporate-Level Goal 2: Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. **(01-DoD-2)** **FY 2001 Subordinate Performance Goal 2.3:** Streamline the DoD infrastructure by redesigning the Department's support structure and pursuing business practice reforms. **(01-DoD-2.3)** **FY2001 Performance Measure 2.3.4:** Logistics Response Time. **(01-DoD-2.3.4)** **FY2001 Performance Measure 2.3.5:** Visibility and Accessibility of DoD Materiel Assets. **(01-DoD-2.3.5)**

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in DoD. This report provides coverage of the Defense Contract Management high-risk area. Although other transactions are not considered to be contracts, we grouped the other transactions in this high-risk area because their purpose is similar.

Management Control Program

DoD Directive 5010.38, "Management Control Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurances that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. We reviewed the adequacy of the DARPA management controls addressing information assurance for the ALP. Specifically, we reviewed the DARPA controls for assessing the adequacy of the management and administration of information security for the ALP design and development.

Adequacy of Management Controls. We identified a material management control weakness as defined by DoD Instruction 5010.40. Management controls were not adequate to ensure that information assurance was properly addressed and evaluated during the ALP development. The recommendation, if implemented, will ensure that proper considerations are made for information assurance. A copy of this report will be provided to the DARPA senior official responsible for management controls.

Adequacy of Management's Self-Evaluation. The DARPA management did not identify information assurance, or the ALP, as an assessable unit and did not perform a self-evaluation. Therefore, we were unable to determine whether management could have identified the material management control weakness. DoD identified information assurance as a significant internal management control problem (DoD systemic control deficiency) in its FY 1999 Annual Statement of Assurance.

Prior Coverage

No prior coverage has been conducted on the subject in the last 5 years.

Appendix B. Transition Plans and Funding

The ALP had completed the third year of a 5-year information technology prototype program and officials had begun to discuss the transitioning of its architecture with the logistics and transportation organizations. The transition's success will depend on the success of the pilot programs to incorporate the ALP architecture.

Transition Goals and Plans. Goals for the ALP include transitioning some of its components as applications directly to the Defense agencies and Military Departments. The following chart identifies the organizations and their pilot programs that will incorporate parts of the ALP architecture. However, the organizations were in the process of obtaining program approval and funds for their respective pilot programs.

<u>Organization</u>	<u>Pilot Program</u>
Defense Logistics Agency	Finished Goods Inventory
U.S. Transportation Command	Agile Transportation Advanced Concept Technology Demonstrator

The short-term goals for the ALP are to transition some components as tools through the DARPA Joint Logistics Demonstrator and the Joint Theater Logistics Advanced Concept Technology Demonstrator. Long-term goals for the ALP are to transition technologies to the Global Combat and Control System and the Global Command Support System.

Transition Funding. The DARPA and the Defense Logistics Agency had not budgeted funds for the ALP beyond FY 2001, and the logistics and transportation communities had not budgeted for the transition of ALP technology. Therefore, the transition of the ALP technology to Defense agencies and the Military Departments is questionable.

Officials have been unsuccessful in obtaining continued sponsorship of the ALP information technology prototype beyond the FY 2001 DARPA-funded effort. Defense agencies and Military Departments' use of the ALP technology was limited to pilot efforts. Continued use of the ALP technology is dependent on the Defense agencies and Military Departments obtaining funds for transitioning ALP. As of January 2000, none of the organizations had decided to provide the necessary funding.

Appendix C. Report Distribution

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Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
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Committee on Government Reform
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Defense Advanced Research Projects Agency



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MAY 1st 2000

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
DEPARTMENT OF DEFENSE

SUBJECT: Response to DoD IG Draft Report on Advanced Logistics Program

In response to the draft report entitled, "Development of the Advanced Logistics Program," dated February 24, 2000 (Project No. OAB-0103), DARPA concurs with the recommendation of the report and has arranged an information assurance risk assessment on the Advanced Logistics Project.

Our major exception to the draft report is that the Advanced Logistics Program is a research and development project, not a system acquisition program, and as such is not subject to same guidelines and constraints. Since this project is research, and its objectives were not in the information assurance domain, we maintain that management controls for the project were appropriate and adequate.

The attachment provides suggested changes to the report. We appreciate the opportunity to review the DoD IG draft report. Should you have further questions regarding this response, Dr. Todd Carrico is our technical point of contact. His phone number is (703) 526-6616.


F. L. Fernandez
Director

Attachment

DARPA COMMENTS ON IG REPORT

EXECUTIVE SUMMARY COMMENTS

The recommendation in the executive summary, as in the report, is to perform an information risk assessment for the ALP technology. DARPA concurs with this recommendation and has commissioned Sandia National Laboratory's Secure Network and Information Systems group to perform this assessment. The assessment will be performed in the July-November, 2000 timeframe and the final report will be available in January 2001. This assessment will include those security measures developed during FY 2000 as well as prior year developments.

AUDIT REPORT COMMENTS

(Page 4, Information Assurance, 3rd paragraph)

Though DARPA acknowledges that its information assurance risk assessment will provide valuable insights to potential transition organizations, it may not completely eliminate the need for an organization to perform a further risk assessment to evaluate the vulnerabilities of ALP against the particular operational requirement and environment in which it will be fielded.

(Page 5, Information Technology Guidance, 1st paragraph)

The ALP program is developing advanced architecture technology to enable greater automation and capability in system developments employing the ALP architecture technology. Since ALP is an architecture technology and not an application the reference made to OMB Circular A-130, Appendix III regarding government policy for information systems does not apply. Further, the reference made to Appendix III in regards to "major application" requirements is not applicable.

(Page 5, Information Technology Guidance, 2nd paragraph)

The product to be transitioned at the end of the ALP project is just the architecture technology, not the demonstration prototype. Consequently, DoD Instruction 5200.40, addressing the accreditation of systems, does not apply. Acquisition efforts using the architecture, after defining the mission and environment components, will consider the certification and accreditation process identified in DoD Instruction 5200.40.

(Page 5, Information Technology Guidance, 3rd paragraph)

The ALP program has been engaged in early technology exploration, not traditional system development. In its early stages, the form and shape of the technology solution was not defined well enough to enable the development of a risk management plan, nor would it have been cost effective to consider such complications before the core technology innovations had been developed and validated.

(Page 6, Transition Plan, 1st paragraph)

DARPA contends that the Military Departments have committed to the transition of the ALP architecture to the extent possible prior to pilot completion. The Department of the Army and the Defense Logistics Agency (DLA) have both sponsored pilot projects based on the ALP technology. These pilot efforts are explicit evaluations of the ALP technology in an operational environment for the express purpose of determining the viability of transitioning the ALP technology. The intent of both the Army and DLA is, if deemed successful under the pilot development activities, to transition the ALP technologies into larger ongoing or emerging information system modernization activities. Under such a transition approach, no separate funding commitment, beyond those already budgeted for the information system modernization activities, is required.

(Page 6, Transition Plan, bullets 1-3)

In the three citations of the use of ALP technologies, it should be noted that in all cases it is the component architecture technologies that have been or are planned to be incorporated, and not the demonstration prototype. This further supports DARPA's assertion that we are building and plan to transition an advanced architecture technology and not a system.

(Page 7, Recommendations)

The recommendation of this report is to perform an information risk assessment for ALP. DARPA concurs with this recommendation and has commissioned Sandia National Labs Secure Network and Information Systems group to perform this assessment. The assessment will be performed during the July-November 2000, timeframe and the final report will be available January 2001. This assessment will include those security measures developed in the FY 2000 as well as prior year developments.

(Page 9, Appendix A, Management Control Program)

DARPA disputes the contention that management controls were not adequate during the ALP development. Since information security was not one of the stated objectives of the ALP technology, it was not appropriate to identify information assurance of ALP as an assessable unit for external or internal evaluation prior to July 2000. Three points need to be reiterated in this regard:

1. ALP is not a system.
2. Information assurance is being addressed in the architecture through incorporation of commercial security technologies and commercial best practices.
3. ALP will not be at a state of maturity to support an Information Assurance Risk Assessment prior to July 2000.

Audit Team Members

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report.

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